Michael T. Davis WLPCS Pre-Calculus	Units 1.5 & 1.6 Practice Quiz October 3-4, 2017

Name: Solutions / Answers

1. Convert the quadratic equation $f(x)=x^2-6x-2$ to vertex form $a=1$ $b=-6$ $c=-2$

$$\text{axis } x=\frac{-(-6)}{2(1)}=\frac{6}{2}=3$$

$$f(3)=(3)^2-6(3)-2=9-18-2=-9-2=-11$$

$V(3,-11)$

$f(x)=(x-3)^2-11$ Answer

2. Convert the quadratic equation $g(x)=2x^2+8x+1$ to vertex form

$$\text{axis } x=\frac{-8}{2(2)}=\frac{-8}{4}=-2$$

$$g(-2)=2(-2)^2+8(-2)+1=2(4)-16+1=8-16+1=-7$$

$V(-2,-7)$

$g(x)=2(x+2)^2-7$

3. Convert the quadratic equation $V(x)=2(x-5)(x+3)$ to vertex form

x-intercepts $x=5$ and $x=-3$

midpoint of 5 and -3 is $x=1$ Vertex

$V(1)=2(1-5)(1+3)=2(-4)(4)=-32$ $V(1,-32)$

$V(x)=2(x-1)^2-32$

4. Convert the quadratic function $k(x)=-(2x+3)(x-11)$ to standard form

$$K(x)=-(2x^2-22x+3x-33)$$
$$=-(2x^2-19x-13)$$
$$=-2x^2+19x+13$$

5. Convert the quadratic function $p(x)=\frac{1}{2}(x+6)^2-10$ to standard form

$P(x)=\frac{1}{2}(x+6)(x+6)-10$ $P(x)=\frac{1}{2}x^2+6x+18-10$

$P(x)=\frac{1}{2}(x^2+12x^1+36)-10$ $P(x)=\frac{1}{2}x^2+6x+8$

6. Convert the quadratic function $A(x) = 2x^2 + 5x - 12$ to factored form

$A(x) = (2x-3)(x+4)$

7. Convert the quadratic function $T(x) = 4x^2 + 6x - 54$ to factored form

$T(x) = 2(2x^2+3x-27)$

$T(x) = 2(2x+9)(x-3)$

8. Without graphing, determine the number of x-intercepts of the parabola with equation $f(x) = \frac{2}{3}(x-5)^2$. If there are real zeros, then find them.

Vertex is $V(5,0)$ which is on the x-axis.

Therefore, there is one x-intercept, namely $(5,0)$.

The one real zero is $\{5\}$

9. Without graphing, determine the number of x-intercepts of the parabola with equation $f(x) = -2(x+1)^2 - 18$. If there are real zeros, then find them.

The vertex is $V(-1,-18)$ and the parabola opens down.

Therefore, there are no x-intercepts.

Therefore, there are no real zeros.

10. Without graphing, determine the number of x-intercepts of the parabola with equation $f(x) = \frac{1}{16}(x-3)^2 - 1$. If there are real zeros, then find them.

The vertex is $V(3,-1)$ and the parabola opens up.

Therefore, there ~~are~~ two real ~~zeros~~. $0 = \frac{1}{16}(x-3)^2 - 1$

$1 = \frac{1}{16}(x-3)^2$ $\quad 16 = (x-3)^2$ $\quad \pm\sqrt{16} = x-3$ $\quad \pm 4 = x-3$

$3 \pm 4 = x$ $\quad x = 7$ and $x = -1$ $\quad \{7, -1\}$

11. Without graphing, determine the number of x-intercepts of the parabola with equation $f(x)=\frac{-1}{3}(x+1)^2+3$. If there are real zeros, then find them.

The vertex is V(-1, 3) and The parabola opens down.
Therefore, there are two x-intercepts (real zeros).
$0=-\frac{1}{3}(x+1)^2+3 \quad -3=-\frac{1}{3}(x+1)^2 \quad 9=(x+1)^2 \quad \pm\sqrt{9}=(x+1)$
$-1\pm 3=x \quad x=2$ and $-4 \quad \{2, -4\}$

12. Without graphing, determine the number of x-intercepts of the parabola with equation $f(x)=(x+1)^2+9$. If there are real zeros, then find them.

The Vertex is V(-1, 9) and the parabola opens up.
Therefore, there are no x-intercepts.
Therefore, there are no real zeros.

13. Determine an equation for the axis of symmetry and coordinates of the vertex of the parabola defined by the quadratic function $f(x)=(x-2)(x+4)$

x-intercepts are $x=2$ and $x=-4$
The midpoint of $x=2$ and $x=-4$ is $x=-1$
axis equation is $x=-1$
$f(-1)=(-1-2)(-1+4)=(-3)(3)=-9 \quad V(-1,-9)$

14. Determine an equation for the axis of symmetry and coordinates of the vertex of the parabola defined by the quadratic function $f(x)=2(x+1)^2-5$

axis equation is $x=-1$ Vertex $V(-1,-5)$

15. Determine an equation for the axis of symmetry and coordinates of the vertex of the parabola defined by the quadratic function $f(x) = -3x^2 + 12x - 5$

$a = -3 \quad b = 12 \quad c = -5$

axis $x = \frac{-12}{2(-3)} = \frac{-12}{-6} = 2$ axis equation $x = 2$

$f(2) = -3(2)^2 + 12(2) - 5 = -3(4) + 24 - 5 = 7$

vertex $V(2, 7)$

16. Determine the real zeros (x-intercepts) of the parabola with equation $f(x) = 3x^2 - 18x$, i.e. solve

$0 = 3x^2 - 18x$

$0 = 3x(x-6)$

$3x = 0 \quad x - 6 = 0$

$x = 0 \quad x = 6$

The x-intercepts are $(0,0)$ and $(6,0)$

The real zeros are $\{0, 6\}$

17. Determine the real zeros (x-intercepts) of the parabola with equation $f(x) = x^2 - 2x - 35$, i.e. solve

$0 = x^2 - 2x - 35$

$0 = (x-7)(x+5)$

$x - 7 = 0 \quad x + 5 = 0$

$x = 7 \quad x = -5$

The x-intercepts are $(7,0)$ and $(-5,0)$

The real zeros are $\{7, -5\}$

18. Determine the real zeros (x-intercepts) of the parabola with equation $f(x) = x^2 - 8x + 9$, i.e. solve

$0 = x^2 - 8x + 9$

$0 = x^2 - 8x + 9 \quad b^2 - 4ac = (-8)^2 - 4(1)(9) = 64 - 36 = 28$

since 28 is not a perfect square, the trinomial does not factor

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(9)}}{2(1)} = \frac{8 \pm \sqrt{28}}{2} = \frac{8 \pm 2\sqrt{7}}{2} = 4 \pm \sqrt{7}$$

$\{4+\sqrt{7}, 4-\sqrt{7}\}$

19. Determine the real zeros (x-intercepts) of the parabola with equation $f(x) = x^2 + 2x - 3$, i.e. solve

$0 = x^2 + 2x - 3$

$b^2 - 4ac = (2)^2 - 4(1)(-3) = 4 + 12 = 16$

therefore, the trinomial factors.

$0 = (x+3)(x-1)$

$x + 3 = 0 \quad x - 1 = 0$

$x = -3 \quad x = 1$

$\{-3, 1\}$